NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE SPECIFICATIONS

WASTE TREATMENT LAGOON

(No.)

CODE 359

GENERAL SPECIFICATIONS

A. Supporting Embankment

FOUNDATION PREPARATION

The foundation area shall be cleared of trees, logs, stumps, roots, brush, boulders, sod, and rubbish. The topsoil and sod shall be stockpiled during construction and spread on the completed dam and spillways.

Foundation surfaces shall be sloped no steeper than a ratio of 1-1/2 horizontal to 1 vertical. The foundation area shall be prepared to adequate moisture content and density, and the surface shall be thoroughly scarified, to allow for proper compaction and bonding of the first layer of fill material to the foundation.

The cutoff trench and any other required excavations shall be dug to the lines and grades shown on the drawings. If they are suitable, excavated material may be used in the permanent fill.

Foundation areas shall be kept free of standing water when fill is placed on them.

FILL PLACEMENT

The material placed in the fill shall be free of detrimental amounts of sod, roots, frozen soil, stones more than 6 inches in diameter (except for rock fills), and other objectionable material.

If openings or sectionalized fills are required, the slope of the bonding surfaces between the embankment in place and the embankment to be placed shall not be steeper than a ratio of 3 horizontal to 1 vertical. The bonding surface shall be treated the same as that specified for the foundation to ensure a good bond with the new fill.

The distribution and gradation of materials shall be such that no lenses, pockets, streaks, or layers of material shall differ substantially in texture or gradation from the surrounding material. If it is necessary to use materials of varying texture and gradation, the more impervious material shall be placed in the center and upstream parts of the fill. If zoned fills of substantially differing materials are specified, the zones shall be placed according to lines and grades shown on the drawings. The complete work shall conform to the lines, grades, and elevations shown on the drawings.

Fill material shall be obtained from selected borrow areas meeting the approval of the designated technician. Unless otherwise designated, it shall be obtained within the storage and/or treatment area of the structure

Moisture Control. The moisture content of the fill material shall be adequate for obtaining the required compaction. Material that is too wet shall be dried to meet this requirement, and material that is too dry shall be wetted and mixed until the requirement is met.

As a minimum, the fill material shall contain enough moisture to be able to form a ball when squeezed in the hand that will not separate when tapped with a pencil. Dry foundation materials shall have moisture added to the top six inches to meet that required for fill material prior to placement of the first layer of fill.

Compaction. Construction equipment shall be operated over each layer of fill to insure that the required compaction is obtained. Special equipment shall be used if needed to obtain the required compaction.

B. Excavation

All applicable sections for supporting embankments will apply, including that for clearing and grubbing, foundation preparation, excavation, and pollution control and project completion.

The completed excavation shall conform to the line, grades, and elevations shown on the drawings and staked in the field. All work shall be completed in a skillful and workmanlike manner. The completed job shall present a workmanlike appearance.

The excavated earth shall be disposed of in the locations specified on the plans and spread or shaped to a uniform top and side slopes so it can be disked or mowed with regular farm equipment.

C. Liner

A new liner shall be designed and installed according to the current rules established by the industry regulatory agency. If the liner is designed by an NRCS engineer it shall be designed based on the criteria found in the conservation practice standard and in accordance with guidance provided in the Agriculture Waste Management Field Handbook, Appendix 10D.

The liner placement shall be installed as specified in the site specific construction specifications prepared by the design engineer. Liner specifications will depend on the type of liner being installed, soil properties of the base and liner material.

D. Computation of Earth Fill and/or Excavation Quantities

Quantities of earth fill and/or excavation shall be computed by approved methods. The earth fill and/or excavation extent will be the sum of the fill and excavation components as defined below:

Fill. The volume of material required for construction of the supporting embankment to the designed settled elevation and dimensions.

- The volume is to be calculated from natural ground before foundation stripping.
- If there are vertical banks to be sloped then the fill amount will be calculated as if these items have already been completed.
- The volume required to backfill the core trench is only included when excavated material cannot be placed in the embankment as it is being excavated. (This means the material must be either stockpiled for later use or is not suitable for fill and must be wasted.)

Excavation. The volume of material required for excavation to the designed neat lines and grades.

- The volume of material required to be excavated to construct the designed centerline dam core trench below natural ground, before foundation stripping (after vertical banks are sloped).
- Volume of material required to be excavated to construct a designed storage/treatment reservoir. When a structure involves a designed excavated pit and a designed embankment the excavated pit volume will be the extent. Exception – fill will be the extent when the volume of fill for the designed embankment is greater than the excavated pit volume.

E. Renovation of Existing Lagoon

SCOPE

Implementation of this conservation practice shall consist of all work necessary to complete the renovation of earthen waste impoundments that have served the design life and are a potential environmental hazard. The renovated lagoon shall meet all current design requirements for storage and/or treatment volume. Evaluation and certification, or reconstruction of the liner shall be required to insure that the liner meets current regulatory requirements.

EFFLUENT REMOVAL

Prior to removal of any effluent from the waste impoundment, a Waste Management Plan must be prepared and approved in accordance with

the Oklahoma NRCS Nutrient Management (590) Standard. Removal of all effluent, to the greatest extent possible, including solids, slurry and liquid shall be achieved in order to renovate the waste impoundment for recertification.

Vigorous agitation of the effluent should result in the accumulated solids being suspended in the liquid creating slurry that can be pumped into spreading equipment. When removal of effluent from the bottom and side slopes using earth-moving equipment is needed, the liner shall not be disturbed. Wheel or track mounted machinery used for removal of the effluent shall not be equipped for aggressive excavation. Only smooth mouthed buckets or blades with no rippers, scarifiers or ripper teeth should be used. Track mounted equipment shall have non aggressive track shoes such as multi-grouser shoes to minimize ground disturbance of the liner.

COMPUTATION OF LAGOON EFFLUENT QUANTITIES

Quantities of waste effluent shall be computed by approved methods. The pumped and/or excavation extent will be the sum of the solids, semi solids and slurry components as defined below:

Solid. Waste with high percent solid typically handled with scraping and front end loading equipment. Can be transported and spread with traditional spreading equipment.

Semi-Solid. Waste with a somewhat firm consistency. Total solids content can range from 10 to 22 percent. Semi-solid waste can be transported and spread as solids using traditional spreading equipment

Slurry. Slurry is a mixture of solid, semi-solid and liquid waste consisting of a solids content ranging from 5 to 15 percent. Waste in this state has fluid handling characteristics requiring special pumping equipment. It can be transported by tank wagon or pump and pipeline.

Liquid. Liquid waste has solids content of 5 percent or less. Liquid waste can be handled using traditional pumping equipment and sprinkler or other irrigation systems.

The volume of waste to be removed for the purpose of renovating an existing lagoon can be determined using as-built information obtained after the initial construction of the waste storage structure. In the absence of as-built information the original design information can be used to estimate the volume. The actual volume of effluent removed can be determined after pumping and removal of the waste using before and after survey information including length, width and elevations before and after removal.

EFFLUENT DISPOSAL

All waste removed from the waste impoundment shall be transferred and spread according to an approved Waste Management Plan prepared in accordance with the Oklahoma NRCS Nutrient Management (590) Standard and in accordance with all local, state and federal laws, rules and regulations.

EMBANKMENT

The supporting embankment around the waste impoundment shall meet the minimum design criteria in the conservation practice standard including elevation, top width and side slopes. The supporting embankments must also meet the minimum construction tolerances in this specification. All eroding and low areas will be filled with suitable fill material and re-vegetated during renovation.

LINER CERTIFICATION

The liner shall be evaluated and certified by a professional engineer registered in the state of Oklahoma according to the current rules established by the industries regulatory agency (ODAFF, ODEQ, EPA, etc).

If the existing liner cannot be certified a new liner shall be designed and installed as stated in section C of this specification.

PUMP DOWN MARKER

In order to meet current design requirements a change in the waste impoundment operating levels could occur due to increased or decreased animal numbers, wash water volume, waste water volume, feed efficiency, storage or treatment period, etc. The permanent markers

shall be checked and reinstalled if necessary to meet the current or existing design.

F. Construction Tolerances

Checkout Elevations	Lower Limit	Upper Limit
Top of Embankment	- 0.1 feet	N.A. [1]
Auxiliary Spillway	- 0.1 feet	+ 0.1 feet

[1]Subject to slope and pipe length criteria

All other elevations that deviate more than 0.1-feet from design elevations must be evaluated for design adequacy except centerline elevation of berms may be +/- 0.5-feet.

An embankment will be acceptable with respect to side slopes when conditions a) and b) or a) and c) are met upon completion of construction.

a).

Planned Side Slope	Planned Unsettled Slopes		Steepest Acceptable Side Slopes
	With 5% Settlement	With 10% Settlement	
2:1	1.91:1	1.82:1	1.5:1
2.5:1	2.38:1	2.27:1	2.0:1
3:1	2.86:1	2.73:1	2.5:1
4:1	3.81:1	3.64:1	3.5:1

b). The planned cross section with allowance for settlement can be superimposed upon and within the plotted cross section of the completed dam, or

c). Exception to b): The cross section will be accepted if it meets a) above, and the sum of the front and back slopes is equal to or greater than the sum of the planned unsettled slopes. (For example, a dam with 2:1 and 3:1 planned slopes and a 10 percent settlement would have a sum of 4.55:1.)

The completed spillway excavation shall conform to the lines, grades, bottom width, and side slopes shown on the plans as nearly as skillful operation of excavating equipment will permit.

G. Vegetation

A protective cover of vegetation shall be established on all exposed areas of embankments, spillways, spoil areas, and borrow areas, according to the guidelines in Oklahoma NRCS Critical Area Planting (342) standard. Vegetation must be in accordance with the specifications developed for the project.

H. Pollution Control and Project Completion

Construction operations shall be carried out so that erosion and air and water pollution are minimal. All work shall be conducted in a skillful and workmanlike manner. The completed job shall present a workmanlike appearance.

Fencing and cover to control erosion and pollution shall be established as needed. Appropriate safety measures, such as warning signs, rescue facilities, and fencing, shall be provided as needed.